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PROJECT-BASED TEACHING IN THE ONLINE MEDIUM: ADVANTAGES AND DISADVANTAGES – CONCLUSIONS AFTER AN ONLINE STUDY MODULE FOR DESIGN STUDENTS

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Abstract: *In the paper, an analysis is made of an implemented short study module "Design Project" for the students of the "Engineering Design" Bachelor program from the University of Forestry in Bulgaria. The aim of this publication is to reveal the process, its failures, and its successes. The dynamics and evolution of the design process were followed during the five days of the study module. The interaction between the students themselves, the teaching staff and the sponsor was observed. To this end, the results of an inquiry are presented. In the conclusion, attention is directed to the online implementation of the Design Project and its influence, as a result of specific conditions (last year of study, the implementation of the Teams platform, the participating teaching staff, and the sponsor) which created the necessary environment for the event. It was found that the online module probably helped for a more concentrated and productive activity, and for the smooth procedures of the event without any waste of time.*

Key words: *online learning, student study module, design assignment, teamwork.*

1. Introduction

In the autumn of the 2012 academic year, an initiative called Project Week was implemented for the first time as an integral part of the curriculum for 3rd and 4th-year cohorts. It carried the aim of students learning how to work in teams. Project Week was introduced as an intensive five-day study module to create realistic conditions for students to work in competing teams, with members chosen by drawing lot.

A designer assignment was proposed jointly by a company in the design field and the teacher team. The organisation of this study event is fully explained in other publications [1, 15-17] and will not be described in detail in this paper.

All teams receive the same assignment

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for a product or a concept. The theme is usually provided by a partner company in the form of a product concept or a design situation with no specific product mentioned. The partner company participates in the course of work, in the interim and final presentation, by sending a senior representative or acting designer. The company also sponsors prizes and takes part in the jury. Student participants are in groups of five to seven people. Students are acquainted with the methods and have already implemented them in another studio class, but under the same conditions [16].

The two years of the recent pandemic, 2020 and 2021, caused the appearance of sources with commentaries concerning the implementation of distance and online teaching of different subjects.

Generally, as a beginning, authors indicate the presence of a new generation: that of 'zoomers', 'digital natives' as a "Response to the needs of Industry 4.0, where human and machine learning are interwoven to enable new possibilities" [7]. Laskova [11] indicates the necessity to further research of 'technological' education: "Seemingly, we have not yet reached an agreement to what technology-enhanced learning is, no profound and ground-breaking theory of digital learning (…) has been conceived yet, nor pedagogical underpinnings in working with technology have been researched and analysed enough" [11].

According to the author, a triangle net exists, consisting of "Individual human learner, human facilitator and technology"; the opinion is stated, that we shall in the future, "have to conduct empirical research investigating post-humanistic position of technology-facilitated human learning." The author asks: "Does the technology change human learning intrinsically?" [11]. In this paper, we are going to consider some of the specifics of the implementation of a creative intensive online module.

Admittedly, online teaching started because of circumstances, and defined the instruments for it: originally, the platforms Google Classroom, Zoom, Skype, and in the year 2021 – the Microsoft Teams platform.

Several publications have demonstrated the methodology, as well as an extensive review of the achievements in the field of distance and online teaching [4, 6, 10]. It is notable that before the pandemic, distance learning had been developed in several universities in the form of separate courses, available for a wide circle of interested applicants. At the University of Forestry, there was the Blackboard online instrument which was developed basically as support for physical learning. The Blackboard instrument was not supported with resources (not enough computer memory) and was not always successful for online learning. This brought about the decision to turn to the Microsoft (MS) Teams platform, where teachers had to organise mandatory online teaching after the lockdown in 2020. This platform became mandatory no earlier than the spring of 2021. Teachers used Zoom, Skype and Google Classroom for lecturing and other communication with students; the last one being best adapted for work and interaction with students.

In some publications, there are comparisons between face-to-face (F2F) and online learning, also called "Emergency Remote Teaching – ERT" [4]. It was noted that differing from distance learning courses or materials, offered in the pre-pandemic period as optional, emergency remote teaching is an obligation. In such

publications it is underlined that effectiveness of teaching in both cases depends on social interaction or the presence (physical or online) of the teacher: "The teacher-student interaction is more present with F2F, than online, where both parties have to use technological means of interaction" [4]. Dvořakova et al. [4] concentrated on online teaching satisfaction and underlined that the focus of their assessment falls on the role and performance of the teacher. Student satisfaction is mostly conditioned by motivation, directed towards the achievement of concrete results. To achieve success, students need regular and systematic monitoring. Effective learning is a result of "Practice activities simulating real-life situations, which are included in online materials, determine relevance and perceived value of these materials". Dvořakova et al. [4] quote an earlier study of Sun et al. [18]: "However, what contributes to student satisfaction most significantly are features of online education such as well-prepared teaching materials, suitable online discussion arrangements, course design, scheduling and instructional expertise". This conclusion is in agreement with the present study.

When comparing face-to-face and online education, authors [2] basically outline the stress generated by the fact that students must increase their own activity in acquiring knowledge. Students must also accept greater responsibility for the learning process and outcome. Technological preparedness, learning management, and help-seeking behaviour are the key aspects for the behaviour of learners. Low levels of stress or anxiety may stimulate motivation and performance, whereas high levels of stress or anxiety have a negative impact on motivation [5].

Complicating factors, according to Dvořakova et al. [4], are the difficulty of working with different platforms, lack of (or asynchronous) communication, easy loss of concentration, and difficulty in dealing online with a large quantity of information [14].

The authors of the present publication are fully aware that, in this case, the scientific discipline of the online event bears huge importance. It must also be mentioned that examples of online instruments for design collaboration already exist. There are professional platforms, such as upwork.com, wix.com, etc., where designers upload their solutions and comment on them. In this way, professionals can help and teach each other, albeit at a higher level. There are two points to particularly note: independent work (research and development of ideas) and the need to share and comment with other practitioners.

During design education, such regular events are clausuras (meaning practical short assignments) during the semester. They are used as an instrument for the assessment of the students' progress. The clausura is a four to five hours intensive development of an individual design assignment, with the goal of checking results in a given design discipline. The implementation of online clausuras became possible by way of using the MS Teams platform. Students receive their assignments online; they work on them and upload the drawings back to the teacher on the platform. A key factor for the effectiveness of the event is the follow-up discussion with all the participants regarding the basic achievements and

mistakes.

In the publication titled 'Creative Collaborative Strategies of Remote Sketching on Design,' Jimenez Narvaez & Segrera [10] looked at the role of designer sketching, which is basically directed towards:

- "Exploring and triggering the iterations of individual or group ideas in the dynamics of the design process;
- Encouraging communication between participants about the graphic externalization of the first ideas without a clear verbal explanation. (See the work of Nagai and Noguchi [13], about the "transformation of key words into images" [12]);
- Highlighting and evaluating graphic proposals developed by the group."

Therefore, the skill of fast sketching is "…a measuring instrument for the figurative fluidity," such as one's ability to "quickly draw examples, elaborations, or restructurings based on a given visual or descriptive stimulus" [3]. Each design sketch represents a unit which is measured without reference to its quality or legibility; what matters is the produced quantity"; this is in fact the goal of brainstorming sessions 1 and 2 in our Design-project.

Further, in the same analysis, it is said that "These initial ideas are key words directly originating from the client's request. The teams concentrate on making sketches that describe these words and explore the images within their figurative context."

Two kinds of designer behaviours are observed: a) nominal work, in which each participant draws their layout sketch on the same page in a parallel way, and b) simultaneous work, in which one participant draws while the other watches, talks or adds details. This kind of work organisation directly relates to the time the members of each team have spent working together and is a behaviour that has been observed by Isaksen [9], and has been defined as "the time of maturing of the group".

Nominal work is explained as selective (one of the sketches by each participant is selected) and then additive (from each participant, one idea is selected, and the team's idea is reached). The interactive manner of work adds all ideas into one, keeping the essence of an idea and complementing it with details by other participants.

Sketching is a key element for design work, especially when the assignment is innovative and asks for original creativity. For students, the participation in such a module is 'live' or 'real' because they approach the assignment from the zero level. They do not have any experience and can live the solution search from the level of 'tabula rasa', i.e., their mind is not prejudiced. Therefore, the transition from 'verbal description' to 'first images' [10] can be implemented by: a) Brainstorming session one, when they explain the verbally defined assignment, and when the first images arise, and b) Brainstorming session two, when students sketch the situations on paper, where the newly developed product is involved.

At the beginning of the online session, students usually prefer nominal work, as Jimenez Narvaez and Segrera [10] described it as a technique of brainstorming. They start separately, generate ideas, and then discuss them together online. This means that individual work prevails at this point. In the next phase, though, when they must discuss achievements, this result is demonstrated by the upload of hand sketches. Then the

discussion happens online. Expectedly, it is important that students should have previous experience because they have already done brainstorming the previous year of their study and know the technique.

In both online modules in 2020 and 2021, students easily uploaded their sketches with their mobile phones. But it remains unknown to us if they used 'simultaneous work', especially in the first phases. We only know that for teams whose participants have good drawing skills, the idea was more clearly and visually generated by means of their sketches. Therefore, 'sketching in a team' de facto was divided in two: individual sketching, upload of sketches and discussion with the whole team. The goal was to overcome initial inertia by means of giving a strict deadline and intensive generation of ideas by excluding the controlling function of the participants' minds. During the online implementation, verbal discussion can be done. Teachers noticed that students tended to forget their original sketches and notes and to follow abstract large lists of concrete qualities for products, which was not the aim. In response, students were asked to return to their first big sheet of sketches and notes; this sheet was made as a compilation of each team's participant ideas.

In this phase, simultaneous work was not clearly followed, because the teachers were not present at every individual team meeting.

Therefore, the key word is 'contact'. Students knew each other, as well as their teachers. They have an assignment with a deadline, a real sponsor, and the idea of winning the associated prize. All these factors add considerable weight to work motivation, which is not present in their general semester-related tasks.

The purpose of the paper is to study the possibilities of implementing a practical design study module in online teaching conditions. In this regard, the following goals and tasks for research were outlined:

1. To test whether it is possible to conduct group work 'project design' in online conditions (without physical contact of participants);
2. To develop new skills as competitive professionals among the students in the online teaching module (team-working and presentational);
3. To identify the skills necessary for the students in the online teaching module of project design;
4. To test students' creativity in online group work conditions;
5. To identify drawbacks associated with the online teaching module of project design.

2. Methodology

The methods included in this research are observation, comparison, structured survey by means of a questionnaire and its interpretation and analysis in the light of the literature review. The questionnaire was structured into three groups: online conditions; students' understanding of the assignment; and interrelations among students and between students and teachers with no physical link. The survey was conducted anonymously on the last day of the module with a cohort of 36 students. Students had previous experience in their 3rd year of study in the same type of study module.

The survey consisted of Google forms and offered advantages for data collection: respondents could be questioned simultaneously; the

probability of influencing the results of the written surveys is lower in comparison to personal interviews; the questionnaire is better structured and prepared than a spoken interview; anonymity of respondents is guaranteed and positively improves the objectivity and reliability of results [8]. Both closed-ended and open-ended questions were asked. Firsthand experience of teachers conducting the module was of key importance.

3. Results

3.1. Student Assignment

Due to the arisen epidemic situation in the autumn semester of 2020, when the COVID pandemic occurred, a teacher team of four lecturers was set up to implement the Study Module "Design Week" using the MS Teams Platform. Students were registered on the platform in advance by the University Administrator. All participating students and teachers were in their homes in different cities of the country.

The sponsor of the event was a company that specialises in organising social activities, basically for children with health, psychologic or mental problems. The sponsor had assigned the students to develop preliminary design for a playground in the form of a speedway for radio-controlled toy models (in 1:10 scale) of racing cars with the size (7 by 11 m). The facility was to be built in an attractive city zone (park or square) and it would be accessible to both children and their parents.

In short, the assignment was to develop a concept, interpret the theme, ponder over it, and to present it at the interim presentation on day three of the module. Afterwards, students developed their work further and showed it on day five during the final presentation.

3.2. Preparation in Advance on the MS Teams Platform

A week before the study module began, the teachers conducting the event had created the workspace on MS Teams. Student teams were designated by drawing lots. For each team, team participants were registered. A common team space for sharing information to all students was devised.

3.3. Observation of Study Module Days: Conflicts, Obstructions, Resistance or Discontent on the Part of the Students

On Day one, teams were gathered on MS Teams. The theme was announced as "The Play of Children". The specifics were explained by representatives of the Teacher Team and the Sponsor

Students met in separate virtual rooms, organised in advance by the Teacher Team. Each Students Team was able to:

- Create sketches, drawings, text files, collages or create files on their own programs and upload the results in One Note Diary of the Team;
- Conduct discussions in the Group space by using a Whiteboard to record all ideas generated in the brainstorming session. They were allowed to interactively place labels, write words, or mark elements.

Understandably, students needed some time to get acquainted with the platform interface and its potential. The first task, namely brainstorming, began afterwards. One peculiarity of the 2020 brainstorming was how the assignment was more defined. Different from previous modules,

this time students did not have to start from choosing their design object. They knew they had to design a speedway for Radio Controlled toy cars. What was left was to clear their own ideas and the theme of the playground.

The teacher team visited each group online according to the timetable announced in advance. They helped by asking students questions and provided answers. Each team selected a speaker to present ideas and distribute tasks between team members.

When teachers discussed student ideas, clear tendencies were noticed of forgetting instructions, leaving aside sketches from brainstorming and delving deeper into abstract lists of product qualities. However, these were not the essence of the assignment. In effect, students had to be taken back to their first long list with all brainstorming ideas. This list, made as a compilation of notions from all members, was used as a starting point.

On Day two, all teams had to agree on one or two ideas which would be presented at an interim presentation on the next day. Despite the teams' clear images that evolved on the first day, some teams felt insecure about what they had to do and changed ideas chaotically. Despite the good themes generated, some personal contradictions emerged. In the middle of Day two, obstructions from the students' part deepened. Some had a very negative attitude. A hostile participant, feeling disoriented, started behaving conflictingly to his partners and teachers.

Teachers visited each team twice (thrice for the conflicting team). This helped to address problematic situations and eliminated typical mistakes for every beginner in an unknown situation. The afternoon of Day two was used to prepare interim presentation materials. Teams had to unite around the idea.

On Day three, the preparation for the Interim Presentation went on as follows until mid-day:

- Pictures of one or two posters in 1000/700 mm format;
- Pictures of a work model in the appropriate scale;
- Script for a 5-minute presentation, where each participant should have a role.

The important point for each team was to distribute roles for every member in the presentations. They had to explain their concept in the best possible way. The aim of the script was to explain the evolution of the theme, how the team settled on that and what problems were revealed.

Student-Teams were strongly advised not to hold their ideas for themselves at the interim presentation. This characteristic was observed with students in previous years, even though that was in-person training. Basic ideas that are kept as secret until the last day, cannot be plagiarized by other teams. However, teachers cannot give support and expert opinion after the interim presentation. The goal of the module is to demonstrate the development of a theme at the final presentation after critiques and remarks from sponsors and teachers at the interim presentation.

The interim presentation was implemented as a video meeting with teachers on the MS Teams platform. All student-teams in the Study Module were present, together with the Teacher team, Sponsor representatives and the Leading Designer (Figures 1 to 6).

Each team had five minutes to present the concept of their design. Students had

their role divisions, per the preliminary instructions by teachers, given in written form in a Study Module Guide. The presentation took place in strict and concise order according to rules. The online presentation, unlike the physical presentation, did not require time for arranging posters, presentation materials or models, because each team had prepared their electronic presentation. All that was needed was to share the screen and start the event.

Fig. 1. *Print screens from consultation on Day Three*

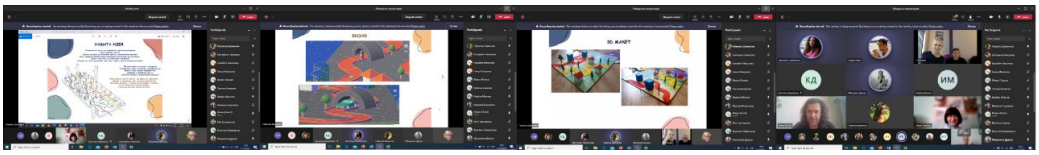

Fig. 2. *Print screens of Team One presenting at the Interim Presentation*

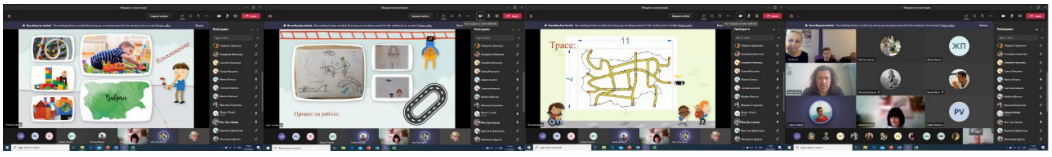

Fig. 3. *Print screens of Team Two presenting at the Interim Presentation*

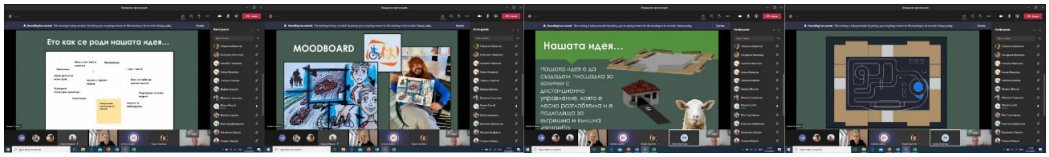

Fig. 4. *Print screens of Team Three presenting at the Interim Presentation*

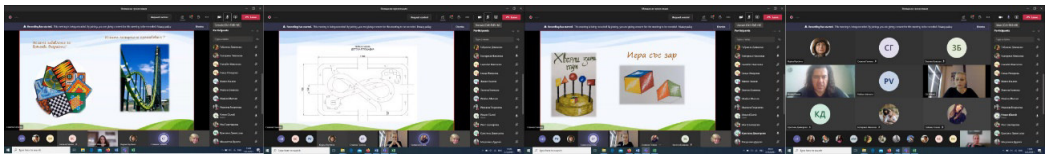

Fig. 5. *Print screens of Team Four presenting at the Interim Presentation*

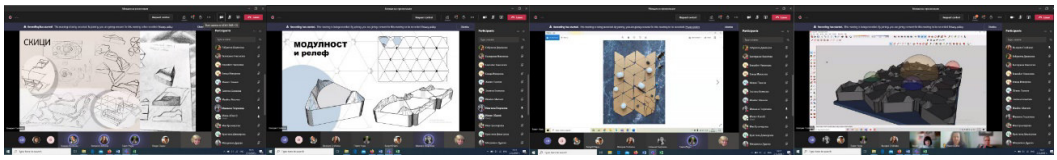

Fig. 6. *Print screens of Team Five presenting at the Interim Presentation*

Summarising the results from the interim presentation, we can say that all five teams demonstrated interesting and original solutions without any coincidence of themes. Developing these first concepts happened with varying results. Basically, the difference arises from the presence of hesitation or, on the contrary, clear and resolute concept.

Overall, two teams were outlined: Team One and Team Five. Despite the early phase, these teams demonstrated the name of their products, motto, shape, principles of assembly, materials, colours, etc. The sponsor representatives were pleasantly surprised to see different concepts generated in only three days.

The advice given by designer Ilian Milinov and the Teacher-Team, together with the positive reaction and commentary of the Sponsor representatives motivated students to work further on the next day. Additional motivation was gained by comparison of outputs from other teams.

On Day four, the envisaged consultations were implemented with discipline and staying within the accepted rules. Students, for their part, expected these consultations and had prepared lists of questions. Critical directions by the Teacher-Team aimed at supporting the Student-Teams towards making the right decisions. These consultations were evaluated highly by the students.

Graphic materials required for the final presentation include final poster/slides with the product views, drawings of the product, 3D-renderrings, name/logo of the product, shape, principles of assembly, materials, colours etc.

Students used much energy, teamwork, and motivation to fully present their projects.

On Day five, the final presentation took place with heightened tension among participants. The invited stakeholders to witness the final presentation on the MS Teams platform included the Sponsor representative, its partner, the lead Designer, other teachers, and a journalist of the specialized press, who also participated in the Jury. The criteria accepted for evaluation were as follows:

- Qualities and originality of the solution;
- Functionality, flexibility, easy transport, accessibility, visibility;
- Adequate colour and graphic solution, choice of materials, general

technical solution of the structure of the speedway terrain;
- Quality of presentation materials and manner of presentation.

The evaluation conducted by each member of the jury involved an online questionnaire, with focus on the accepted criteria.

4. Results and Discussions

4.1. Compiling the Questionnaire; Organisation and Implementation of the Survey

On the Day five, before the announcement of the winners, each student received a questionnaire that consisted of 39 questions. These can be grouped as follows:
- Questions related to the mental and physical condition of the participants for the period of the online study module;
- Questions relating to the online work on the MS Teams platform and its instruments;
- Questions relating to the assignment theme of the Study Module and its interpretation;
- Questions comparing the online with the physical (in-person) implementation of the Study Module;
- Questions concerning teamwork.

4.2. Commentary on the Results According to Separate Groups of Questions

A. Questions related to the mental and physical condition of the participants for the period of online study module

Question no. 1: "During the past week, how did you feel?", the majority of the respondents felt happy; some were stressed and anxious, but no one felt bored (Figure 7).

Also, 75% of respondents described the past project week as inspiring positive emotions (Figure 8).

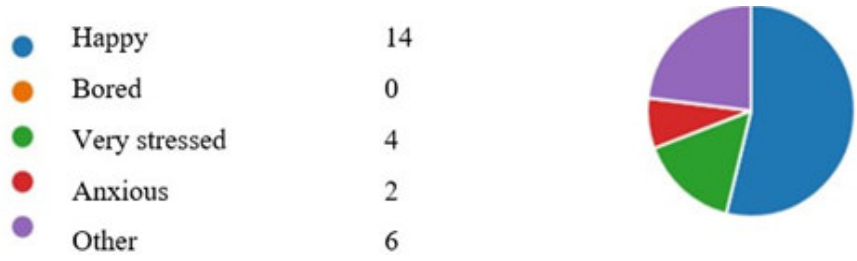

Fig.7. Question no. 1: During the past week you felt…

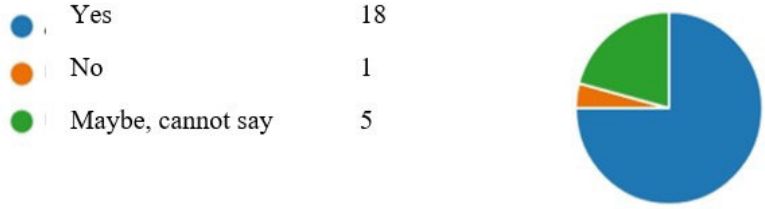

Fig. 8. *Question no. 38: "Could you describe the past project week both as useful and inspiring positive emotions?"*

Question no. 9: "We know we bored you with almost 40 questions, but could you please leave a comment, recommendation, or opinion?" - here we can outline the following 'open' answers: "You managed to leave students to think on their own and did not impose your opinion on our ideas". "It would be good for Project Week Modules to be implemented with more of such provocative and abstract themes". "All was very interesting and well organized. I think it will be even more interesting if the Project Week Module is longer. I think thus there will be more interesting ideas, better developed. The presentations and final results of each team will be more complete", "It would be better to have more consultations with teachers".

To Question no. 2 "How comfortable did you feel while doing your university assignments online", rather varying and fragmented answers were received. Almost equal numbers of respondents answered they felt somewhat uncomfortable (37, 5%) or somewhat comfortable (33, 33%), an equal number of students answered they felt very comfortable; also, that they felt neither comfortable, nor uncomfortable (12, 5%), three people felt very comfortable, and only one felt very uncomfortable.

As basic reasons for the presence or absence of comfort (Question no. 3), the following were pointed out: "The theme and everything connected with it and the Project Module were very interesting, but we had stressful moments due to short terms and insecurity of work"; "Because I have more time"; "We can work together with the team on online platform any time available, but we have no real contact with teachers and other students"; "Misunderstanding in the team"; "Working in teams in-person is difficult in principle, let alone online"; "Because online communication is not good enough"; "Online communication and presentation have many positive sides and are even more comfortable in some aspects".

B. Questions relating to the online work on the MS Teams platform and its instruments

Question no. 4: "To what extent did you manage the instruments of remote learning, used at the University?", 48.5% of the respondents managed somewhat easily, 29% managed very easily, 12.5% of respondents could not say, 10% found it difficult. Not one respondent found extreme difficulties (Figure 9).

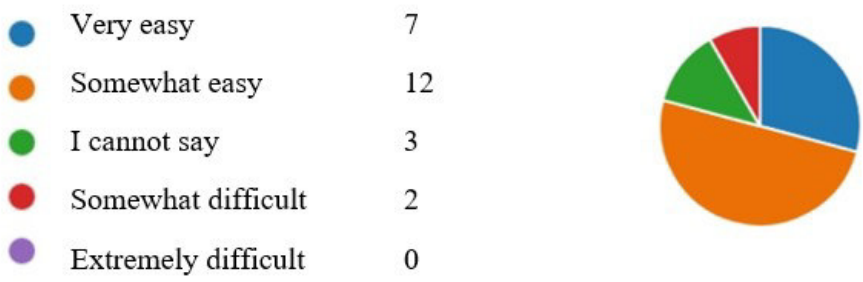

Fig. 9. *Question no. 4: "To what extent did you manage the instruments of distance learning, used at the University?"*

Among the challenges that students encountered during the distance learning in this Study Module, students pointed out the following: too many distracting elements (37.5%), problem with Internet link (12.5%), social isolation (8.3%), 12.5% of respondents did not encounter difficulties, and 29.2% of respondents marked "other" (Figure 10).

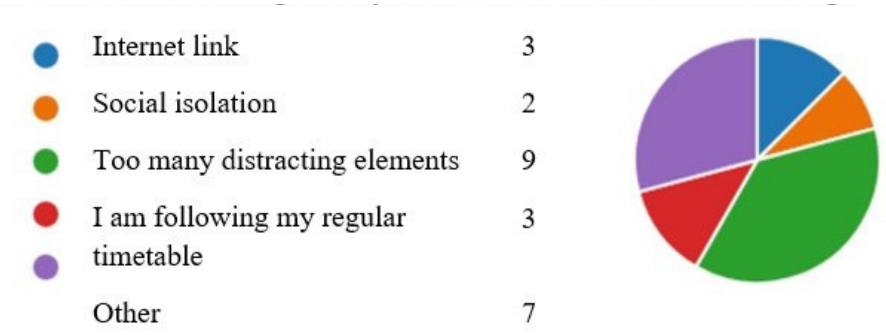

Fig. 10. *Question no. 5: What are the challenges that you encounter now in distance learning?*

To Question no. 6, "Compare what you learned online with what you learned attending classes physically", 50% of respondents answered that in this way they learned less, 20.8% learned some more, 16.7% found no difference, and 12.5% thought that in this way they learned much less (Figure 11).

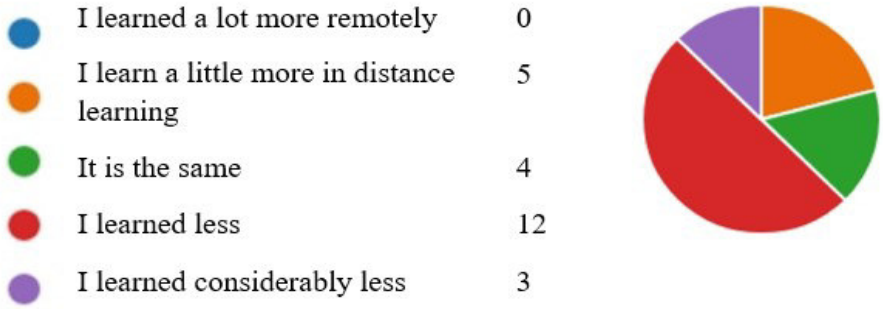

Fig. 11. *Question no. 6: "How much are you learning online compared with attending classes physically?"*

Asked what they could propose to improve the implementation of the Project Week Module online (Question no. 34), students gave the following answers: 34% thought that they needed better skills in computer programs; 33% indicated that in the study program there should be more modules with actual design process; 11% thought that the duration of this module should be increased. The rest of the answers reached equal percentage (22%) between the answers "more often consultations with teachers"; "better access to Internet", and "better

platform/space for implementing".

To Question no. 8, relating to the comprehension of the assignment theme of the Study Module and its connected tasks, 79.2% of respondents easily understood the theme and the connected tasks, and 20.8% said they did so with difficulty.

To Question no. 9: "Why was it difficult/easy?", the most often given answers were: "The theme was too general"; "Most difficult of all was the understanding of the whole assignment, the rest was comparatively easy". The answers that specified why it was easy are: "The theme gave great freedom"; "It was presented accessibly and clearly"; "Because the team worked together well".

91.66% of the respondents thought that the theme was formulated clearly (Question no. 10), 100% of the respondents thought that they managed the tasks of the creative process (Question no. 11). All the respondents thought that they implemented an effective brainstorming session (Question no. 12).

It is important to draw adequate conclusions from the interim presentations. Was it successful or not? Did students manage to develop their concept after that? Were there any issues with preparing graphic materials for the final presentation (in view of the online limitations)? The answers received were: "Yes, I think that Interim Presentation was very useful"; "I cannot define if it was successful or not for our team"; "It was creative and successful"; "Interim presentation was useful"; "Interim presentation was very successful, and I think we managed to develop further our idea"; "Interim presentation cleared many issues…"; "It helped a lot for the structural shaping of the idea"; "The interim presentation was not successful, but I think we managed to develop further our idea".

C. Questions comparing the online with the physical implementation of the Study Module

The following aspects of remote learning were considered: "To what extent did you manage to use the instruments for online learning at the University?" (Question no. 4). 50% of the respondents answered they managed easily enough; 29.17% admitted that they managed very easily, while 12.5% and 8.3% answered that they could not say and was somewhat difficult, respectively (Figure 12).

Fig. 12. *Question no. 4: "To what extent did you manage to use the instruments for remote learning used at the University?"*

Asked what specifically were the challenges that they encountered during the moment of online learning (Question no. 5), students predominantly answered

with the following: the quality of internet connections; too many distracting factors, and social isolation (Figure 13).

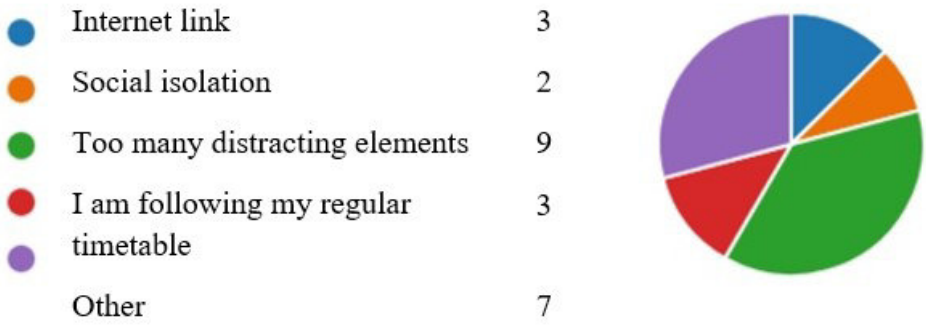

Fig. 13. *Question no. 5: "What are the challenges that you encounter now in distance learning?"*

To Question no. 6 "How much are you learning online compared with attending classes physically?", 50% of the respondents answered that they learned less; 20.8% learned a little more; 16.7% found no difference, and 12.5% thought that they learned much less (Figure 14).

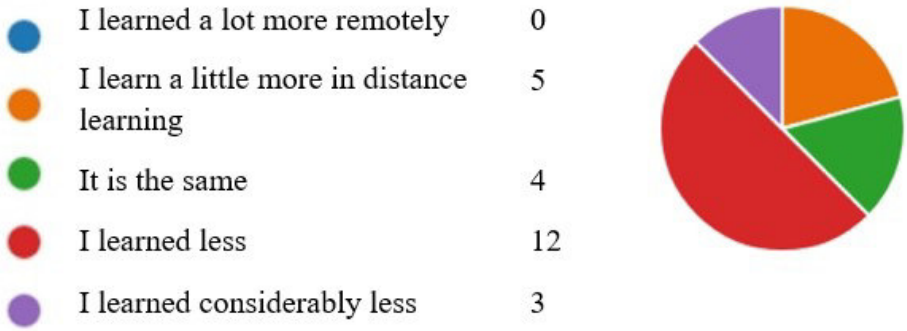

Fig. 14. *Question no. 6: "How much are you learning online compared with attending classes physically?"*

Despite the challenges encountered, to question no. 7: "Did you notice any progress in relation to previous year's Project Week, when in Year 3?", 75% of students answer they noticed progress in relation to last year's Project Week Module; 16.7% could not say, and 8.3% did not notice any progress.

D. Questions in relation to teamwork

The possibility of good teamwork is key for success. In reference to Question no. 15 "How did I team up with the rest of the team?", 83.3% of respondents answered that they worked together easily, 12.5% could not say, and only 1 student said it was difficult.

Most often, the reasons for easy/hard teamwork (Question no. 16: "Why did I team up easy/hard?") were: "It is easy to do work with intelligent and diligent people who can do compromises, such as yourself"; "There was good communication"; "We worked well together as a whole, although problems of communication were due to online work, which was why we could not understand each other and develop the idea"; "I communicated easily with my teammates"; "The team had good communication"; "The reason is, we waited and listened to what each had to say".

To Question no. 17: "Were you instructed on how to do teamwork?", 66.7% of respondents answered affirmatively.

As far as the average result to Question no. 18: "How do you evaluate your team's work?" (according to a six-stage system, where six is maximum and two is minimum), overall, the value given by students for their own work was 5.63.

Regarding Question no. 19 "What do you see as successful in your teamwork?", here are some of the answers: "Everything, from communication, to task distribution and the final design"; "Everyone contributed something to the design"; "Respect and ability to listen, to be considerate, to be sympathetic. I am very content of my teammates"; "I appreciate the fact that most of us were able to speak out their opinion".

As failures in teamwork (Question no. 20) were considered mostly anxiety, harder communication, the lack of enough skills in some of the teammates. Despite the failures pointed out, more than half of respondents answered they did not have any.

To question no. 21 "What drawbacks appeared at the different phases of work?", students answered: "Because of online ambience, we could not present our ideas"; "Drawbacks can be overcome"; "Bad Internet link and the noise my parrot made". Both technical reasons (bad Internet) and unsuccessful teamwork seemed to cause drawbacks.

In spite of all difficulties, students gave a mark of 5.75 (of maximum 6) to their final presentation (Question no. 22 "How do you appreciate the final presentation of your team?").

To Question no. 23 "What are the more serious issues you encountered during teamwork?", students gave the following answers: "We did not express our ideas clearly at the beginning"; "No serious issues"; "To consider most of the requirements of the sponsor".

E. Questions relating to the students' evaluation of the event

Teachers were well evaluated in Questions no. 26 (Figure 15), 27 (Figure 16), 28, and 29. Students gave an overall mark of 5.58 (of max.6) to the Teacher Team.

Fig. 15. *Question no. 26: "Was the teacher consultation time enough?"*

Fig. 16. *Question no. 27: "Were teacher remarks contradicting?"*

To Question no. 28 "What is your overall evaluation for the support and advice of Teacher team?", students provided an average mark of 5.58.

To Question no. 29 "Describe in words your impressions", 24 students said "Teachers helped us extremely"; "Provocative, funny, interesting"; "I am glad we tried online learning, because of the world situation".

To Questions no. 30 to 37 (Figures 17 and 18), students gave overall positive evaluations both to the impact of the study module on their own education and skills.

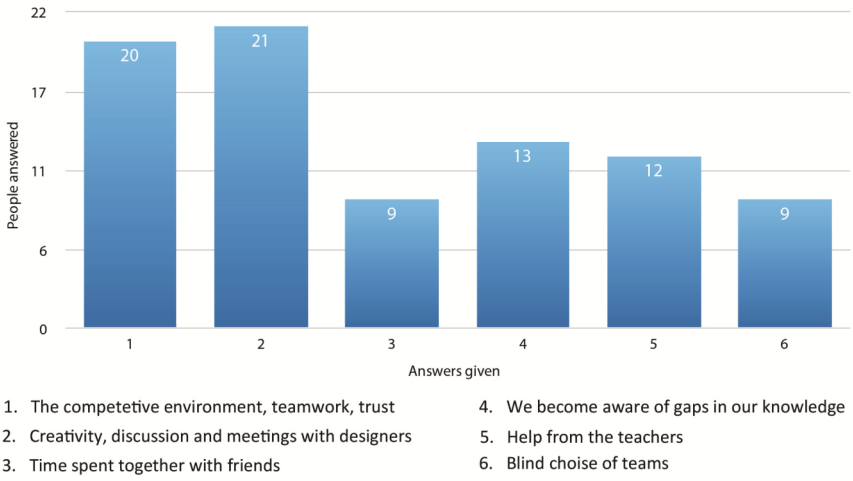

Fig. 17. *Question no. 33: "Which aspects do you appreciate the most during the past Project Week Module?"*

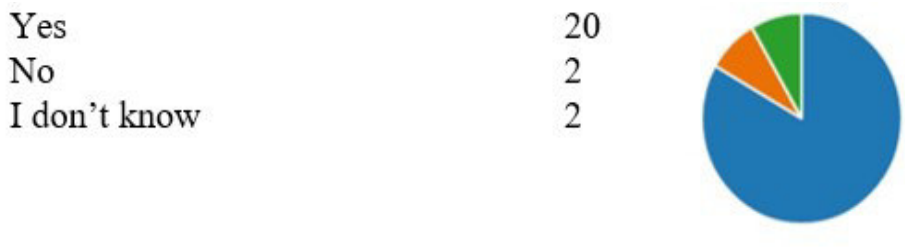

Fig. 18. *Question no. 36: "Do you think there should be more than two such modules in your education program?"*

Also, they answered that they would like to have more of such modules in their overall study program. The average result to question 30, "How do you evaluate the skills you acquired during the Project Week Module?" is 4.92. To Question no. 31, "List some of the acquired skills?", students gave the following answers: "Work with 3D programmes and teamwork"; "No answer for the moment"; "Tolerance". To Question no. 32: "Do you think that your participation in this module will have an impact on your professional development?", 87.5% of respondents answered "Yes". To Question no. 37 "Write down why there should/should not be more such modules in your education program", students gave the following answers: "They put us in a live business situation"; "There should be more such modules, because they require teamwork"; "As much as it looks scary to do a design project for five days".

4. Conclusions

In the paper, an analysis was made of the short online study module 'Design Project' (also called Design Week) with students in the Bachelor of Engineering Design program from the University of Forestry. The aim of the paper was to test the feasibility for implementing a practical design module under online learning conditions. The dynamics and evolution of the design process were analysed during the five-day module. It was found that the event procedure helped for more concentrated work, more productive activities, and saved time:

1. The study revealed that students managed to team up to generate excellent results. Underlying and supporting factors for the success include students' preparation during the previous year, they knew each other and the teachers, the time of this study being their last regular semester;
2. Besides the expected evaluation for students, this online module instituted an award system funded by the sponsor. The requirements set before participants were professional, and short-termed. It brought about an intensive work schedule and high motivation for results;
3. An intensive timetable is a double-edged sword: with teamed-up groups, it gave more adrenaline and improved motivation. With failed teams, it brought the feeling of failure, with procrastination strategy, obstruction, and negative talking;

4. The study findings agreed with other in the literatures that considered satisfaction in online learning. The preparation towards the online Design Week was more demanding than the traditional 'in-person event';
5. Student satisfaction can be clearly traced in the questionnaire answers. It was mainly determined by motivation, directed towards achieving specific results. Students not only expected this event as a personal challenge, but reached actual results, which are at the base of overcoming difficulties, feelings of managing the assignment and professionalism in life;
6. Stress was found to be a considerable motivating force. This was confirmed in the implementation of the study module;
7. To achieve results, students were obliged to increase their personal responsibility and act towards achieving their goals. They overgrew the usual passive and unmotivated behaviour;
8. New skills were acquired through the online platform; teaming up with the rest of the group, the use of graphic software both for the Interim and for the Final Presentation;
9. This online module represents an excellent opportunity for the students to learn to distribute time budget shortly;
10. The teams proved their creative potential by demonstrating different solutions to the assigned problem, as well as the possibility of carrying out the work online;
11. The presence of technical issues as well as the insufficient knowledge of some software products may be a hindrance for the quality of concept development.

The following issues are therefore outlined for future research and the following recommendations may be given for successful work in the field of practical study design modules online:

1. Socially significant assignment themes seriously impact the motivation of students. Therefore, careful choice of the assignment themes is strongly recommended;
2. Due to the short period of the event, students are obliged to generate solutions during the first two days of the module. It is recommended that the Teacher Team be responsible for high-quality guidance of the brainstorming session taking place during the first two days;
3. Online modules need very good preparative work; appropriate space should be created on the online environment for each team;
4. Each stage of the work should be precisely defined by means of tasks and required results;
5. Communication should be intensive and concentrated, to direct students towards the final goal of each stage;
6. Since the beginning of the brainstorming session, the Teacher-Team has the obligation to carefully assess which of the generated ideas has development potential. This is important, since more often than not students themselves abandon some of their own good ideas.

References

1. Angelova, D., Raycheva, R., Chipev, R., 2019. Student Workshop: Creativity in Progress. In: PRO LIGNO – Wood Science and Engineering in the Third Millennium - ICWSE 2019, 7-9 November, 2019, Brasov, Romania, vol. 2, pp. 549-557.
2. Bork, R., Rucks-Ahidiana, Z., 2013. Role ambiguity in online courses: "An Analysis of student and instructor expectations". In: CCRC, Working paper no. 64, New York: Community College Research Center, Columbia University. Available at: https://ccrc.tc.columbia.edu/publications/role-ambiguity-in-online-courses.html. Accessed on: August 25, 2020.
3. Carrol, J.B., 1993. Human cognitive abilities: A survey of factor-analytic studies. Cambridge University Press, Cambridge, United Kingdom. DOI: 10.1017/CBO9780511571312.
4. Dvořakova, K., Emmer J., Janktova R. et. al., 2021. From F2F to ERT: University students' perception of remote learning during the first COVID-19 lockdown. In: Journal of Efficiency and Responsibility in Education and Science, vol. 14(2), pp. 89-100. DOI: 10.7160/eriesj.2021.140203.
5. Heckel, C., Ringeisen, T., 2019. Pride and anxiety in online learning environments: achievement emotions as mediators between learners – Characteristics and learning outcomes. In: Journal of Computer Assisted Learning, vol. 35(5), pp. 667-677. DOI: 10.1111/jcal.12367.
6. Hodges, C., Moore, S., Lockee, B. et al., 2020. The difference between emergency remote teaching and online learning. In: EDUCAUSE Review, March 27.
7. Hussin, A., 2018. Education 4.0 made simple: Ideas for teaching. In: International Journal of Education and Literacy Studies, vol. 6(3), ID article 92. DOI: 10.7575/aiac.ijels.v.6n.3p.92.
8. Iarossi, G., 2006. The power of survey design: A user's guide for managing surveys, interpreting results, and influencing respondents. Available at: https://openknowledge.worldbank.org/handle/10986/6975. Accessed on: August 15, 2020.
9. Isaksen, S., 1994. Facilitating creative problem solvent groups. An occasional paper of the creativity. In book: The customer is NOT always right? Marketing orientations in a dynamic world, pp. 12-21.
10. Jimenez Narvaez, L.-M., Segrera, A., 2010. Creative collaborative strategies of remote sketching on design, in design creativity. In: International Conference on Design Creativity, 2011, pp. 241-248. DOI: 10.1007/978-0-85729-224-7.
11. Laskova, K., 2021. 21st century teaching and learning with technology: A critical commentary. In: Academia Letters, ID article 2090. DOI: 10.20935/AL2090.
12. Nagai, Y., Noguchi, H., 2002. How designers transform keywords into visual images. In: Conference Proceedings of the 4th Conference on Creativity and Cognition,

Loughborough, United Kingdom, October 13-16, 2002. DOI: 10.1145/581710.581729.

13. Nagai, Y., Noguchi, H., 2003. An experimental study on the design thinking process started from difficult keywords: modelling the thinking process of creative design. In: Journal of Engineering Design, vol. 14(4), pp. 429-437. DOI: 10.1080/0954482031000160691 1.
14. Newman, T., Beetham, H., 2017. Student digital experience tracker 2017: the voice of 22,000 UK learners. Available at: https://digitalstudent.jiscinvolve.org/wp/2017/06/26/student-digital-experience-tracker-2017-the-voice-of-22000-uk-learners/. Accessed on: August 15, 2020.
15. Raycheva, R., Angelova, D., Vodenova, P., 2016a. Project-based learning in engineering design in Bulgaria: expectations, experiments and results. In: European Journal of Engineering Education, vol. 42(6), pp. 1-18. DOI: 10.1080/03043797.2016.1235140.
16. Raycheva, R., Jivkov, V., Angelova, D. et al., 2013. Design workshop for students. In: Proceedings of 3rd International Conference "Education, Science, Innovations" – ESI' 2013, June 9-10, 2013, Pernik, Bulgaria, pp. 85-95. DOI: 10.13140/2.1.3076.7680.
17. Raycheva, R., Jivkov, V., Angelova, D. et al., 2016b. Study module "Project week": through the eyes of students. In: Innovations in Woodworking Industry and Engineering Design, vol. 9(1), pp. 46-53.
18. Sun, L., Tang, Y., Zuo, W., 2020. Coronavirus pushes education online. In: Nature Materials, vol. 19(6), ID article 687. DOI: 10.1038/s41563-020-0678-8.